Estimating $\log_{10} a$ with bisection (Ver. 2)

We can estimate $log_{10}a$ by bisection (you can read about bisection in the text book) which starts with prescribing range [L, U] where $log_{10}a$ is actually in. For finding $log_{10}a$, starting with [0, a] is too large and may cause problems when calculating bisection (you can try $a = 10000.5$)

For this task, we suggest estimating U with $1 + \lfloor log_{10}a \rfloor$ which is equal to $a \div 10$ (round down) looping to 0, for example, $a = 120$, 120//10 equals 12, 12//10 equals 1, 1//10 equals 0, use 3 steps to 0; hence, you should use U as 3 for bisection.

Hint: you should follow these steps

1. Receive input as a
2. Prescribe L = 0
3. U equals to number of steps which use to a//10 to 0 (hint: you may use while loop)
4. Use bisection to estimate $log_{10}a$ start with [L, U] from 2. and 3.
5. Check that a and b is close when $|a - b| \leq 10^{-10}\max(a, b)$

Input

A real number a (a must more than or equal 1).

Output

Estimation of $log_{10}a$ round to 6 decimal places.

Example

Input (from keyboard)	Output (on screen)
1	0.0
100	2.0
100000000	8.0
123456	5.091512